

# Package ‘interactionTest’

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**Type** Package

**Title** Calculates Critical Test Statistics to Control False Discovery Rates in Marginal Effects Plots

**Version** 1.2

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**Description** Implements the procedures suggested in Esarey and Sumner (2017) <<http://justinesarey.com/interaction-overconfidence.pdf>> for controlling the false discovery rate when constructing marginal effects plots for models with interaction terms.

**Depends** stats, R (>= 3.4)

**License** GPL

**LazyData** true

**RoxygenNote** 6.1.1

**Encoding** UTF-8

**NeedsCompilation** no

**Repository** CRAN

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bootFun	<i>Bootstrapping t-statistics</i>
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**Description**

This function is defunct.

**Usage**

```
bootFun(...)
```

**Arguments**

... Any argument to the function (ignored).

**References**

Esarey, Justin, and Jane Lawrence Sumner. 2018. "Corrigendum to 'Marginal Effects in Interaction Models: Determining and Controlling the False Positive Rate.'"

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fdrInteraction	<i>Critical t-statistic</i>
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**Description**

This function calculates the critical t-statistic to limit the false discovery rate (Benjamini and Hochberg 1995) for a marginal effects plot to a specified level.

**Usage**

```
fdrInteraction(me.vec, me.sd.vec, df, type = "BH", level = 0.95)
```

**Arguments**

me.vec	A vector of marginal effects.
me.sd.vec	A vector of standard deviations for the marginal effects.
df	Degrees of freedom.
type	Should the BH (Benjamini and Hochberg 1999) or BY (Benjamini and Yekutieli 2000) correction be used? Options are "BH" (the default) or "BY".
level	The level of confidence. Defaults to 0.95.

**Value**

The critical t-statistic for the interaction.

**Author(s)**

Justin Esarey and Jane Lawrence Sumner

**References**

Benjamini, Yoav, and Yoel Hochberg. 1995. "Controlling the False Discovery Rate: A Practical and Powerful Approach to Multiple Testing." *Journal of the Royal Statistical Society, Series B* 57(1): 289-300.

Benjamini, Yoav, and Daniel Yekutieli. 2001. "The Control of the False Discovery Rate in Multiple Testing Under Dependency." *The Annals of Statistics* 29(4): 1165-1188.

Clark, William R., and Matt Golder. 2006. "Rehabilitating Duverger's Theory." *Comparative Political Studies* 39(6): 679-708.

Esarey, Justin, and Jane Lawrence Sumner. 2017. "Marginal Effects in Interaction Models: Determining and Controlling the False Positive Rate." *Comparative Political Studies* 51(9): 1144-1176.

Esarey, Justin, and Jane Lawrence Sumner. 2018. "Corrigendum to 'Marginal Effects in Interaction Models: Determining and Controlling the False Positive Rate.'"

**Examples**

```
## Not run:
data(legfig)                # Clark and Golder 2006 replication data

# limit to established democracies from the 1990s
dat<-subset(legfig, subset=(nineties==1 & old==1))

lin.mod <- lm(enepl ~ eneg + logmag + logmag_enepl + uppertier_enepl + uppertier +
proximity1 + proximity1_enepl + enepl, data=dat)

# save betas
beta.mod <- coefficients(lin.mod)
# save vcv
vcv.mod <- vcov(lin.mod)

# calculate MEs
mag <- seq(from=0.01, to=5, by=0.01)
me.vec <- beta.mod[2] + beta.mod[4]*mag
me.se <- sqrt( vcv.mod[2,2] + (mag^2)*vcv.mod[4,4] + 2*(mag)*(vcv.mod[2,4]) )

ci.hi <- me.vec + 1.697 * me.se
ci.lo <- me.vec - 1.697 * me.se

plot(me.vec ~ mag, type="l", ylim = c(-4, 6))
lines(ci.hi ~ mag, lty=2)
lines(ci.lo ~ mag, lty=2)

fdrInteraction(me.vec, me.se, df=lin.mod$df, level=0.90)                # 4.233986

ci.hi <- me.vec + 4.233986 * me.se
ci.lo <- me.vec - 4.233986 * me.se
```

```

lines(ci.hi ~ mag, lty=2, lwd=2)
lines(ci.lo ~ mag, lty=2, lwd=2)

abline(h=0, lty=1, col="gray")
legend("topleft", lwd=c(1,2), lty=c(1,2), legend=c("90% CI", "90% FDR CI"))

## End(Not run)

```

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<code>findMultiLims</code>	<i>Determine Critical t-Statistic For Marginal Effects Plot</i>
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### Description

This function is defunct.

### Usage

```
findMultiLims(...)
```

### Arguments

... Any argument to the function (ignored).

### References

Esarey, Justin, and Jane Lawrence Sumner. 2018. "Corrigendum to 'Marginal Effects in Interaction Models: Determining and Controlling the False Positive Rate.'"

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<code>legfig</code>	<i>Replication data for Clark and Golder (2006)</i>
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### Description

District magnitude and ethnic heterogeneity data from a pooled sample of established democracies in the 1990s. Data originally from Clark and Golder (2006).

### Format

A data frame with 754 rows and 33 variables:

**country** country name  
**countrynumber** country number  
**year** year of observation  
**enep1** electoral parties  
**eneg** ethnic heterogeneity

**logmag** district magnitude  
**legelec** legislative election  
**preselec** presidential election  
**regime** regime as of 31 Dec of given year (0=democracy, 1=dictatorship)  
**regime\_leg** regime type at time of leg. election (0=democracy, 1=dictatorship)  
**eighties** election in 1980s closest to 1985  
**nineties** election in 1990s closest to 1995  
**old** elections in countries that did not transition to democracy in 1990s  
**avemag** average district magnitude  
**districts** number of electoral districts  
**enep** effective number of ethnic groups fearon  
**enep\_others** n/a  
**enpp** parliamentary parties - uncorrected  
**enpp\_others** n/a  
**enpp1** parliamentary parties - corrected  
**enpres** effective number of presidential candidates  
**medmag** median district magnitude  
**newdem** first election of new democracy  
**proximity1** proximity - continuous  
**proximity2** proximity - dichotomous  
**seats** assembly size  
**upperseats** number of upper tier seats  
**uppertier** percentage of uppertier seats  
**uppertier\_eneq** uppertier\*eneq  
**logmag\_eneq** logmag\*eneq  
**proximity1\_enpres** proximity1\*enpres  
**twoelections** n/a  
**twoelections1** n/a ...

### Source

Clark, William R., and Matt Golder. 2006. "Rehabilitating Duverger's Theory." *Comparative Political Studies* 39(6): 679-708.

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